

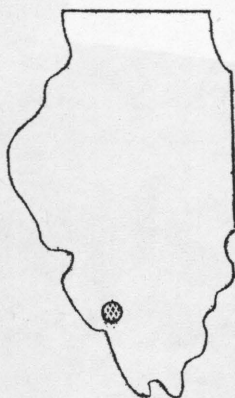
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State of Illinois
Department of Registration and Education
STATE GEOLOGICAL SURVEY DIVISION
John C. Frye, Chief

GEOLOGICAL SCIENCE FIELD TRIP
GUIDE LEAFLET
SPARTA AREA

RANDOLPH COUNTY

COULTERVILLE, BALDWIN, CHESTER, AND RENAULT QUADRANGLES



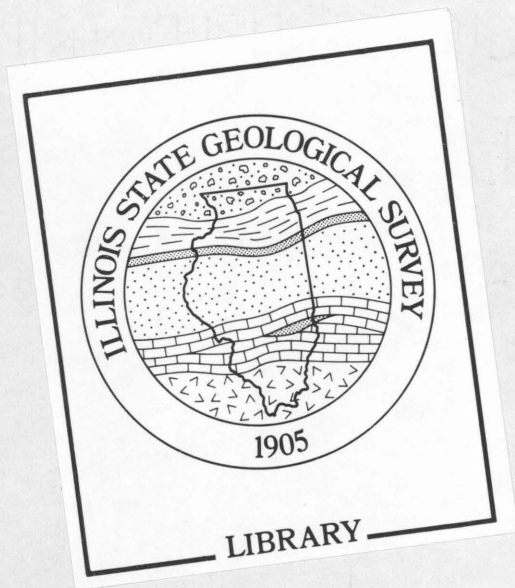
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Leaders
I. Edgar Odom, George M. Wilson, G. M. Dow

Urbana, Illinois
April 15, 1961

GUIDE LEAFLET 1961A

HOST: SPARTA HIGH SCHOOL



To the Participants:

It has been said that the landscape is truly beautiful only when we intelligently understand the varied forces that have worked through the ages to develop it. The result of this understanding is increasing enjoyment and appreciation of the natural features about us.

The Geological Science Field Trip program is sponsored by the Illinois State Geological Survey. It is designed to acquaint you with the Illinois landscape, the rock and mineral resources, and the geological processes that have led to their origin. With this program, we hope to stimulate a general interest in the geology of Illinois and a greater appreciation of the state's vast mineral resources and their importance to the over-all economy.

We encourage you to ask the tour leaders any questions that may occur to you during the trip. Discussion often clarifies points that otherwise would remain confused to many of the participants. We also invite your written comments upon the trips, so that we might improve them as much as possible.

Additional copies of this guide leaflet, as well as itineraries for trips that have been held in the past, may be obtained free of charge by writing to the Illinois State Geological Survey. Maps are available for 30 cents each.

We hope you enjoy today's trip and will come again.

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SPARTA GEOLOGICAL SCIENCE FIELD TRIP ITINERARY

(Note: Have someone read the guide as we travel through the countryside, so that the driver will be able to learn the geology of the area, also.)

Abstract

Pleistocene deposits and Pennsylvanian and Mississippian Rocks are exposed in the field trip area. The Pleistocene deposits include Illinoian till and Wisconsinan loess.

The Pennsylvanian No. 5 and 6 Coals lie at relatively shallow depths in this area. The thickness of the No. 5 bed varies greatly from place to place with the No. 6 averaging approximately 6 feet in thickness throughout the area. The trip includes a visit to an active strip mine where extraction, preparation of coal and measures directed toward reclamation of spoil banks are discussed.

West of Sparta is the type area of the Mississippian Chester Series. The lithologic variations in this sequence of sandstones, shales and limestones are discussed, and the sequence is compared to the Ohio Valley section of southeastern Illinois.

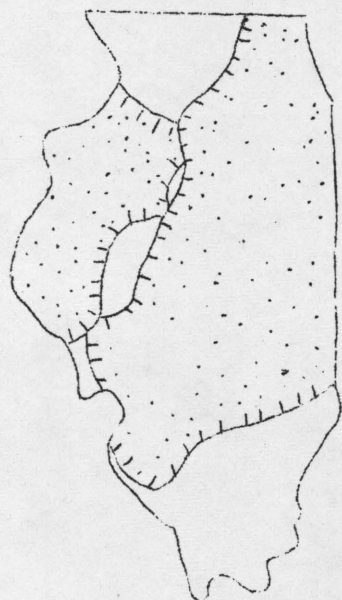
Other geological phenomena considered on the trip include Karst topography and recent changes in the course of the Mississippi River at Kaskaskia Island.

- 0.0 0.0 Caravan assembles at Sparta Community High School, corner of North St. Louis Street and West Hood Avenue. Proceed south on North St. Louis Street.
- 0.5 0.5 STOP. Continue straight ahead.
- 0.1 0.6 STOP. St. Louis Street and West Broadway. Continue ahead on South St. Louis Street.
- 0.1 0.7 STOP. North Jackson Street. Continue ahead on South St. Louis Street.
- 1.1 1.8 Note the gentle rolling nature of the topography.
- 1.3 3.1 SLOW. Turn right on Schuline Road.
- 1.1 4.2 Crossroad. Continue straight ahead.
- 0.4 4.6 Crossroad. Turn left (south).
- 0.4 5.0 The surface in the Sparta region is heavily mantled by loess.

Loess, a wind deposited silt, forms a blanket from 0 to 50 feet thick covering the bedrock. This material was blown from the Mississippi River Valley during the Pleistocene, or Ice Age, by strong winds that are always present in the vicinity of glaciers. Glaciers cover only the island of Greenland and the continent of Antarctica today, but less than 20,000 years ago a comparable glacier existed about 150 miles north of here. Two glaciers, the Kansan and the Illinoian, are thought to have covered the Sparta region.

The Kansan glacier barely reached Sparta, but the Illinoian covered the entire area as far south as Carbondale and Harrisburg. In the lower part of some road cuts in this vicinity, pebbly glacial deposits of Illinoian age can be seen under the yellow, brown loess.

STAGES OF GLACIATION



KANSAN
(2nd Stage)



ILLINOIAN
(3rd Stage)



WISCONSINAN
(4th Stage)

The loess was largely deposited during the last, or Wisconsinan, glacial stage as melt water poured down the Mississippi River Valley. In summers, the valley of the Mississippi was flooded by water from the melting glacier. In the winters, when little melting occurred and the summer floods subsided, the sand and silt in the valley were exposed and dried, and strong winds spread the fine material over adjacent uplands. If we examined in detail the size of the silt composing the loess along a straight line from the Mississippi River eastward, we would find that the silt becomes finer eastward. The wind deposited the coarser silt material first near the river.

- 1.7 6.7 STOP 1. Outcrop of the No. 5 Coal exposed in the bed of Little Mary's River on left side of road. The section: coal about $2\frac{1}{2}$ feet, overlain by about 7 feet of gray sandy shale and about 8 feet of Pleistocene gravel and loess.

Sparta is on the western edge of the Illinois coal basin, and for many years several mines operated here. Beyond the city limits to the west, south, and east, large blocks of No. 6 Coal have been mined out underground. All of these mines are now closed. The only active mine in the area is the Southwestern Illinois Coal Corporation strip mine near Percy, which will be our next stop.

Numerous strip mines are located in a narrow belt along the edge of the Illinois coal basin where some of the state's thickest coal beds occur under less than 100 feet of overburden. In 1958, the Illinois State Geological Survey published a report (Circular 260) on the strippable coal reserves of Jackson, Monroe, Perry, Randolph, and St. Clair Counties. This study reported large tonnages in the Sparta area lying at strippable depths. Other reports by the Geological Survey show that large reserves that could be mined underground also exist in the area.

The important coal beds in this area are the Herrin No. 6 and the Harrisburg No. 5. The Herrin coal averages approximately 6 feet in thickness. The thickness of the Harrisburg coal is quite variable, ranging only a few inches up to 5 feet. The Herrin coal has been mined extensively in the area, the Harrisburg coal, very little.

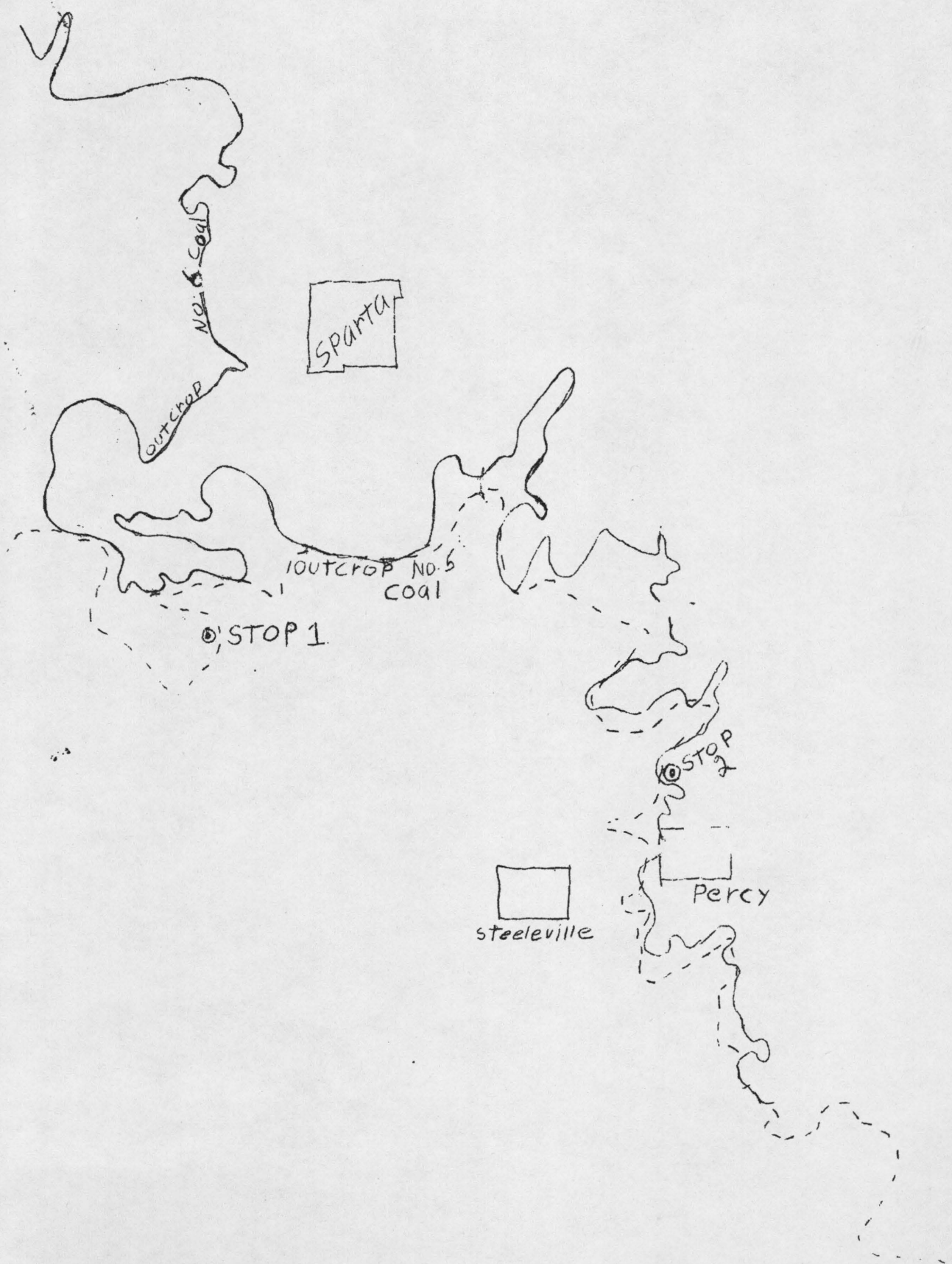
This outcrop of the No. 5 Coal is the best in the region. The No. 6 Coal outcrops about one half mile to the north. (In this immediate area, these coal beds are separated by 20 to 30 feet of limestone and shale.)

This also is a good place to examine the loess present in the cut bank several feet above the coal.

The illustration showing the outcrop line of the Herrin coal and the depth of the overburden in the Sparta-Percy area is reproduced from Illinois State Geological Survey Circular 260.

- 0.5 7.2 CAUTION, crossroad. Continue straight ahead.
- 0.7 7.9 SLOW, entering village of Blair.
- 0.1 8.0 SLOW, turn left.
- 2.1 10.1 CAUTION, bridge over Little Mary's River.
- 0.3 10.4 STOP. Turn right on Highway 43 (south).
- 2.0 12.4 Note excellent view of loess in roadcuts on right and left.
- 0.1 12.5 CAUTION, turn left (east) on Highway 43.
- 0.2 12.7 STOP. Junction Highway 43 and 150. Turn left (east) on 43 and 150.
- 0.8 13.5 Descending into valley of Mary's River.
- 0.3 13.8 Bridge over Mary's River.
- 0.3 14.1 Entering city of Steeleville.

Outcrop Lines of the Harrisburg No. 5 and
the Herrin No. 6 Coals in the Sparta Region



0.8 14.9 Steeleville Business District.

1.3 16.2 CAUTION, railroad crossing.

0.8 17.0 Turn left on haulage road of the Southwestern Illinois Coal Corporation.

STOPS 2, 3, and 4. Southwestern Illinois Coal Corporation, Strip Mine.

Mine officials will conduct the group to various points in the mine and on the mine property. Stop 2 will be in the active stripping area where we can examine the rock succession above the coal and see the equipment used to remove this material. At Stop 3 mine officials will explain present projects directed toward utilization of spoil bank areas. Stop 4 will be at the preparation plant where various treatment processes required to ready the coal for shipping will be explained.

This mine is producing the Herrin No. 6 bed. The Harrisburg bed we saw at the first stop lies about 25 feet below the No. 6 at this location.

The rock succession exposed is quite variable both laterally and vertically.

PENNSYLVANIAN ROCKS IN ILLINOIS AND THE ORIGIN OF COAL

Pennsylvanian sediments typically consist of many different rock types, the outstanding type being coal. In Illinois, coals are commonly overlain by black sheety shale ("roof slate") followed by limestone with marine fossils. The limestone is usually overlain by gray shale also containing marine fossils. Beneath the coal there is an underclay, in turn sometimes underlain by an underclay limestone or shale, then sandstone. This type of rhythmic succession of different kinds of strata is repeated in much the same sequence some 50 times where the Pennsylvanian rocks are thickest. Each rhythmic succession of Pennsylvanian rocks is called a cyclothem. An attached sheet shows an ideally complete cyclothem, but seldom do we find all the units present.

The thickness of the Pennsylvanian system and individual cyclothem varies greatly from place to place. An example of this is the interval between the Colchester (No. 2) Coal and the base of the Pennsylvanian which averages about 125 feet in western Illinois, while in the southeastern part of the state part of the Pennsylvanian column is represented by about 1200 feet of strata. Although deposition started relatively early in Pennsylvanian time in western Illinois, it either proceeded very slowly or was interrupted frequently by intervals when no sediments were deposited.

The many different rock types in the Pennsylvanian system indicate many rapid changes of environment which took place repeatedly. At that time rivers were bringing sediments from the north and east, possibly as far away as the present Atlantic coast and the region

south of Hudson Bay. The Midwest was a low flat swampy area lying just a little above sea level but subject to frequent marine invasions as the land rose or sank, or the sea level raised or lowered. That these conditions existed is evident from the nature of the sediments. Many of the shales, limestones, and ironstones above the coals contain marine fossils. The coals are believed to have formed in broad fresh water marshes somewhat like the Dismal Swamp of Virginia. Most of the sandstones, conglomerates, underclays, underclay limestones, and some shales probably accumulated in fresh-water environments such as river valleys, lagoons, lakes, or lowland plains. There is no area in the world today that has conditions like those that existed during "Coal Measures" time.

Plants and trees grew luxuriantly in "Coal Measures" time. In the jungle-like growths, the plants most common were huge tree ferns that had fronds five or six feet long and grew to a height of more than 50 feet. Along with them were seed ferns (now extinct), giant scouring rushes, and large scale trees, which grew to heights of 100 feet or more.

The large scale trees we find preserved in the coals do not have growth rings. The luxuriant growth and lack of growth rings probably indicate that the climate that prevailed at this time was warm and without seasonal change. As the plants fell into the swampy waters, they were partially preserved, buried by later sediments and converted into coal.

- 22.2 Turn left on Highway 43 (west).
- 1.0 23.2 Entering city limits of Steeleville.
- 1.5 24.7 CAUTION, railroad crossing.
- 0.6 25.3 Bridge over Mary's River.
- 0.3 25.6 Note the yellow color of the loess exposed at the side of the valley on the left.
- 0.8 26.4 SLOW, junction Highway 43. Continue ahead on Highway 150 (west).
- 0.6 27.0 SLOW, turn right on New Palestine road.
- 0.4 27.4 As we proceed westward, notice that the topography becomes considerably more dissected nearing the Mississippi and Kaskaskia Rivers.
- 0.9 29.3 Note the thick section of loess exposed in roadcut on right and left.
- 0.1 29.4 Bridge over Little Mary's River.
- 0.8 30.2 Bridge over Welge Creek.
- 0.6 30.8 Outcrop of glacial till in lower part of the cut on right.

Despite years of geological research the boundary of the Illinoian ice sheet in this region is not fully settled. We find direct evidence of the glacier in the form of glacial till - a mixture

of clay, sand, pebbles, and boulders - at numerous places between Sparta and Fort Kaskaskia State Park. Thus we know that this area was covered by the Illinoian glacier. However, to the south, especially near the Mississippi River, the evidence is not quite so direct. The till, if it was present, has largely been removed because erosion was extremely rapid adjacent to the river. However, from time to time new exposures are discovered which make it possible to adjust the boundary.

According to one interpretation, the boundary follows the Mississippi River Valley from near Modoc to Rockwood, then eastward passing just to the north of Giant City State Park. This is the boundary that is shown on the Geological Map of Illinois prepared by the State Geological Survey in 1945.

In January 1961, a new boundary was proposed by Dr. M. M. Leighton, Chief Emeritus of the Survey, on the basis of new evidence gathered by Dr. Leighton and fellow geologists. He extended the boundary along the Mississippi Valley 10 miles further south to Fountain Bluff near Gorham, then eastward past the north end of Giant City.

0.8 31.6 Outcrop of Lower Pennsylvanian sandstone in creek on left.

0.8 32.4 Outcrop of Pennsylvanian sandstone in ditch on left.

The ridge along the asphalt is underlain by sandstone of Lower Pennsylvanian age. This sandstone is present almost to Highway 3.

The area of deposition of the sediments that form the Pennsylvanian rock column was much larger at the end of the Pennsylvanian Period than at the beginning. As a result, the younger strata cover a much larger area than the older strata. The Lower Pennsylvanian sandstones are thickest in the central and southern part of the Illinois Basin. They are thin or not present at all along the western side of the basin, north of central Randolph County. To the south, in Jackson County, the Lower Pennsylvanian sandstones thicken rapidly. Massive beds of this sandstone are exposed in the vicinity of Alto Pass, Giant City State Park, Ferne Clyffe State Park and along the crest of the Shawnee Hills further east.

The next oldest sequence of rocks is a series of sandstones, shales, and limestones of Upper Mississippian age called the Chester Series. The Chester region is the type locality for this sequence of rock. All other rocks of equivalent age throughout the world are compared with those in this area. The Mississippi Valley is the type locality not only for the Chester Series but the entire Mississippian rock sequence. The Mississippian System averages about 2,000 feet in thickness in the type area.

0.9 33.3 T-road (south), continue ahead on blacktop road.

1.1 34.4 The loess is the parent material of the soils in Randolph County. The soils usually have a low lime content because of leaching of the lime by water. Soil productivity can be kept relatively high, however, if lime is added regularly and a balanced fertilizer is used.

- 0.7 35.1 Hamlet of New Palestine. CAUTION, crossroad.
- 1.6 36.7 T-road south. Continue straight ahead. Note that the streams and gulleys in this region are more numerous than in the Sparta area.
- 2.2 38.9 STOP, Highway 3. EXTREME CAUTION. Continue straight ahead on road to Fort Kaskaskia State Park.
- 0.6 39.5 Note the deeply entrenched valleys in the immediate vicinity of the Mississippi River.
- 0.4 39.9 The hills in the distance are the Ozarks of Missouri
- 0.4 40.3 CAUTION, Hill.
- 0.3 40.6 SLOW, turn right into Fort Kaskaskia State Park.
- 0.5 41.1 Note the Mississippi River directly below.
- 0.2 41.3 STOP 5. Lunch. Fort Kaskaskia State Park.

Fort Kaskaskia State Park, comprising 201 acres in Randolph County near Chester, was incorporated in the Illinois Park System in 1927 as a memorial to the early French and American pioneers who brought civilization to the Illinois wilderness.

Of the town of Kaskaskia, which was once "commercial queen of the west," the first capital city of Illinois, the seat of government during territorial days, and one of the principal settlements of the French, nothing remains today. Across the river are the earthworks and foundations of the old fort and the old Pierre Menard Home at the base of the hill on which the fort stood.

Kaskaskia was founded in 1703, and soon attracted a sizable number of settlers and traders. For a number of years it was protected by a wooden stockade, but the structure was designed for Indian defense only. During the French and Indian War the inhabitants, fearing a British attack, petitioned for a fort and offered to furnish the materials. Their petition was granted, and Fort Kaskaskia, made of heavy palisades, was built on the bluff above and across from the town. There it stood until 1766, when the townspeople destroyed it rather than have it occupied by the British, to whom control had passed in 1765.

In 1778 George Rogers Clark took Kaskaskia from the British and garrisoned his men in Jesuit buildings which had been turned into barracks upon the suppression of that order. Thereupon the Illinois Country became a county of Virginia. But with the end of the Revolution local government broke down and Kaskaskia was plunged into anarchy. In 1784 John Dodge, a Connecticut adventurer, and a group of desperadoes, seized and fortified Fort Kaskaskia, and terrorized the villagers for several years.

In 1787 Illinois became a part of the Northwest Territory under the government of the United States. In 1809 Kaskaskia became

the capital of the Illinois Territory, created in that year, and in 1818 reached the peak of its importance, becoming the capital of the new State of Illinois. Three rooms in the home of George Fisher were rented for use by the State, and there the first session of the General Assembly was held. In 1820, however, the capital was moved to Vandalia and Kaskaskia's decline began.

A Mississippi River flood nearly destroyed the town in 1844 and the remnants of the site were washed away in 1910. Commemorating the memory of the vanished town, the State has built on the Kaskaskia Island the Kaskaskia State Memorial where hangs the "Liberty Bell of the West." This 650 pound bell was cast in France in 1741 and given by King Louis XV to the Kaskaskia church. This bell rung out lustily the Fourth of July night in 1778 when George Rogers Clark captured the town.

Geological Background

In addition to the historic events which have occurred in this area, there are rather recent geologic events of importance to be considered. Presumably during the Tertiary Period, erosion wore down Illinois and adjacent Missouri to a low plain that stood only a few feet above sea level. In fact, during the Tertiary Period, the sea advanced up the Mississippi Embayment and several times covered the southern tip of Illinois.

However, before the Pleistocene Epoch and the coming of the glaciers, Illinois and Missouri were uplifted several hundred feet and the subsequent erosion carved out the present network of streams and valleys. The Mississippi River, probably born during the Late Tertiary Period, was able to maintain its existence during the uplifting by cutting a valley into the rock. The great torrents of melt water that flowed down the Mississippi Valley during the Ice Age certainly contributed to the widening and the deepening of the valley.

The large and powerful Mississippi has always been a romantic feature in the history of the exploration and settlement of the West. When the early settlers came to this region and settled on Kaskaskia Island, the Mississippi River flowed in a broad meander on the west side of the island, and the Kaskaskia on the east side. Sixty years ago, March 18 and 19 in 1881, flood waters cut away the narrow strip of land between the rivers, and since then the Mississippi has flowed on the east side. Since the boundary between Illinois and Missouri was established before this change, Kaskaskia Island is a part of Illinois.

- 0.2 41.5 Turn around and return to park entrance.
- 0.4 41.9 The site of Fort Gage, now known as Fort Kaskaskia.
- 0.3 42.2 STOP. Park exit. Turn right (west).
- 0.2 42.4 Note the severe erosion in the thick loess to the left.

- 0.1 42.5 SLOW, turn right.
- 0.1 42.6 Home of Pierre Menard, the first Lieutenant Governor of Illinois. The historical marker gives the following information, "This home was built about 1800 by Pierre Menard, 1766-1844, presiding officer of the Illinois Territorial Legislature and First Lieutenant Governor. The building is of French Colonial Architecture. The kitchen contains the original fireplace and water basin and a restored bake oven. The original slave house stands at the rear."
- 0.3 42.9 The numerous blocks of limestone that are lying beside the road are talus blocks of Menard limestone that have slid or fallen from the bluff.
- 0.5 43.4 The original settlement of Kaskaskia was directly across the river from this point, on the northeast point of Kaskaskia Island.
- 0.5 43.9 SLOW, bridge.
- 0.2 44.1 Entering village of Riley Lake.
- 0.2 44.3 SLOW, turn right.
- 0.1 44.4 SLOW, bridge over small creek, (5-ton load limit.) About half way up the hill is an abandoned quarry in the Menard and Okaw formations.
- 1.0 45.4 Note large sinkholes on right and left.
- 1.4 46.8 SLOW, entering town of Ellis Grove.
- 0.1 46.9 STOP. Continue straight ahead.
- 0.2 47.1 STOP. Turn left.
- 0.1 47.2 STOP. Intersection Highway 3, turn left on Highway 3.
- 0.8 48.0 Note sinkhole on right. This area is underlain by Okaw limestone, one of the formations in the Chester Series.
- 0.1 48.1 Note sinkhole in farmer's barnlot on left.
- 0.2 48.3 Note plugged sinkhole on left.
- 0.5 48.8 Note two sinkholes on right that are serving as farm ponds.
- 0.7 49.5 Bridge over Nine Mile Creek.
- 0.6 50.1 SLOW, turn right.
- 0.5 50.6 STOP 6. Discussion of Sinkholes.

There are approximately 25 sinkholes here in a square mile area. Some have an open outlet, while in others the outlet is plugged. We have been traveling through sinkhole country for several miles. This landscape feature is referred to as Karst topography. Sinkholes

develop only in regions that are underlain by thick highly jointed limestone. Rain falls upon the earth, takes on some of the organic acid, enters the joint planes and then attacks the limestone. The waters move along the joint planes, constantly enlarging them. With time the joints widen sufficiently to allow the surficial materials to fall into the widened crevices. Extensively developed, the dissolved joint systems become caverns and caves.

There are four prerequisites for maximum Karst development. First, there must be present at or near the surface a soluble rock. Secondly, and one of the most important factors, this soluble rock should be dense, highly jointed, and preferably thin bedded. A highly permeable rock is unfavorable because the rainfall will be absorbed and move through the whole body of the rock rather than concentrate along joint and bedding planes. Permeability as permitted by numerous joints and bedding planes is favorable if the rock is soluble. The Ste. Genevieve and St. Louis limestones of Mississippian, Meramecian age which underlie this upland region are soluble, relatively dense, thin bedded, and highly jointed.

A third condition essential to Karst development is that there exist entrenched major valleys below uplands underlain by soluble and well jointed rocks. This condition is essential so that the water that enters and flows along the joint planes has an outlet. The Mississippi and Kaskaskia Rivers are deeply entrenched below this limestone upland.

- 0.3 50.9 SLOW, turn left on T-road (north).
- 0.1 60.0 Note the orange-brown loess on right and left.
- 1.7 61.7 T- road east, continue straight ahead.
- 0.6 62.3 CAUTION, railroad crossing, two tracks.
- 0.2 62.5 STOP. Turn left on blacktop to Evansville.
- 0.1 62.6 Entering town of Evansville.
- 0.4 63.0 S-curve.
- 0.4 63.4 SLOW, turn left, entering Evansville Business District.
- 0.3 63.7 CAUTION, railroad tracks and junction Highway 3.
- 0.1 63.8 STOP. Turn right on Highway 3.
- 0.0 63.8 Bridge over Kaskaskia River.
- 1.8 65.6 Note excellent loess exposure on right and left.
- 2.6 68.2 SLOW, junction Highway 155.
- 0.1 68.3 Turn left on Highway 155, then immediately left (south) on county blacktop road.

3.4 71.7 SLOW, steep hill.

0.1 71.8 STOP 7. Outcrop of Okaw Limestone.

The Chester Series Okaw formation attains a maximum thickness of about 200 feet and consists principally of massively bedded limestone separated by shaly layers. Only a small part of the formation is exposed at this stop. Here the limestone is relatively pure and quite fossiliferous.

There is great lateral and vertical lithologic variation among the formations composing the Chester Series. Basically the series, when examined in outcrop, is an alternating sequence of sandstone, shale, and limestone formations. However, when individual formations are studied laterally, they frequently change from sandstone to shale or shale to limestone. The variations reflect the influence of water depth in the Illinois Basin and unstable conditions during Chester time. The sandstones are believed to indicate shallow water near shore deposits, perhaps beach deposits accompanying transgressive seas, while the shales and limestones record deeper water conditions.

The Chester formations recognized in this area compared to those in the Ohio Valley section are as follows:

Chester Area	Hardin County Area
Kinkaid limestone	Kinkaid limestone
Degonia sandstone	Degonia sandstone
Clore limestone and shale	Clore limestone and shale
Palestine sandstone	Palestine sandstone
Menard limestone and shale	Menard limestone and shale
	Waltersburg sandstone
Baldwin limestone and shale	Vienna limestone and shale
	Tar Springs sandstone
	Glen Dean limestone and shale
Okaw limestone and shale	Hardinsburg sandstone
	Golconda limestone
Ruma Shale and sandstone	Cypress sandstone
Paint Creek shale and limestone	Paint Creek sandstone and shale
Yankeetown chert	Bethel Sandstone
Renault sandstone and shale	Renault limestone and shale
Aux Vases sandstone	

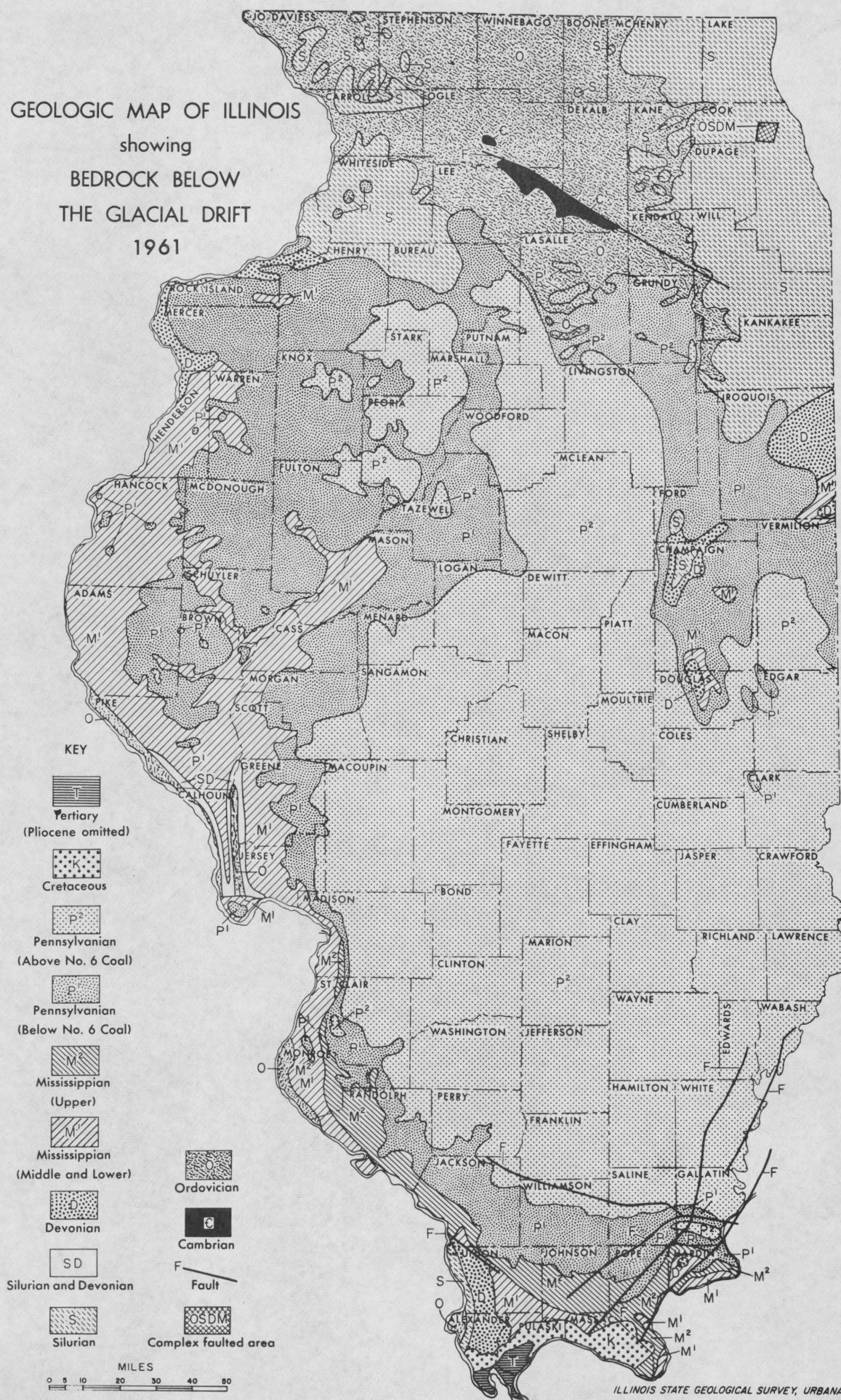
A large variety of fossils are available at this stop. The bryozoa Archimedes and the blastoid Pentremites are the rare members of the assemblage occurring here.

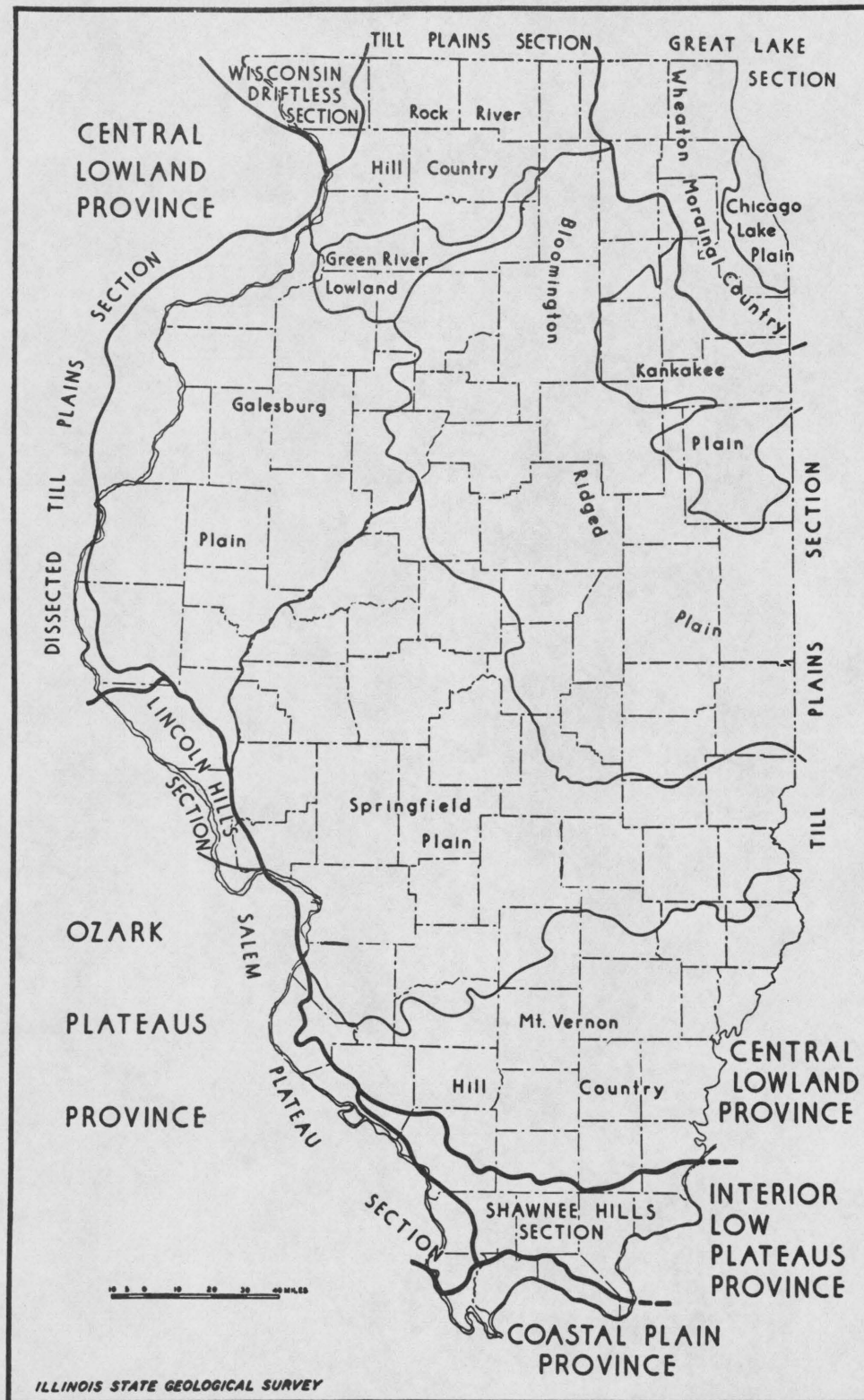
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Suggested References for Further Study of
the Geology of the Field Trip Area

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2. Southern Illinois Mineral Resources and Industries. Illinois State Geological Survey Circular 152, 1949, by M. M. Leighton and W. H. Voskuil.
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6. Physiographic Divisions of the Area Covered by the Illinoian Drift Sheet in Southern Illinois, 1929, by Paul MacClintock.
7. Illinoian Glaciation in Illinois. Journal of Geology, vol. 69, No. 1, January 1961, by M. M. Leighton and J. A. Brophy.

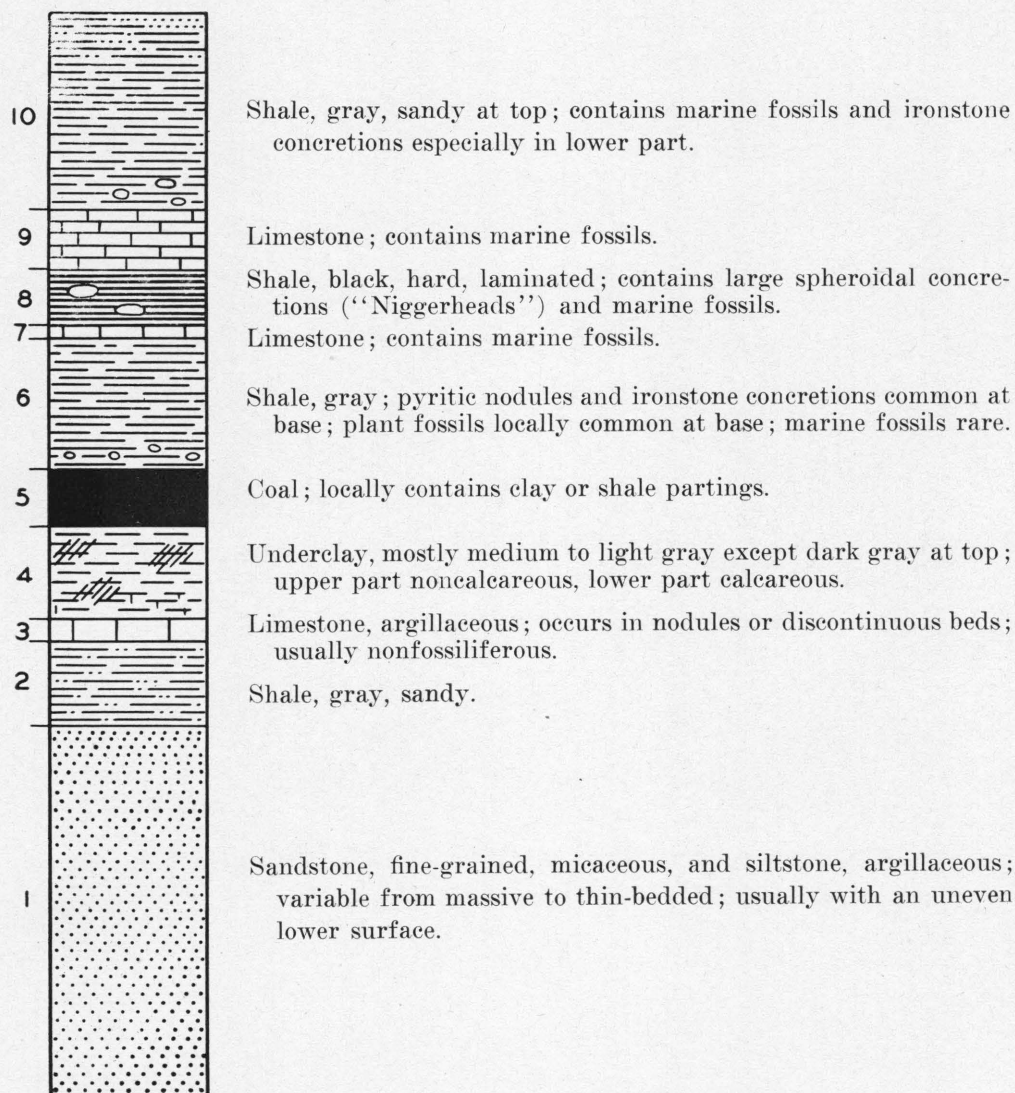
GEOLOGIC MAP OF ILLINOIS
showing
BEDROCK BELOW
THE GLACIAL DRIFT
1961





PHYSIOGRAPHIC DIVISIONS OF ILLINOIS

(Reprinted from Illinois State Geological Survey Report of Investigations 129, "Physiographic Divisions of Illinois," by M. M. Leighton, George E. Ekblaw, and Leland Horberg)



AN IDEALLY COMPLETE CYCLOTHEM

(Reprinted from Fig. 42, Bulletin No. 66, Geology and Mineral Resources of the Marseilles, Ottawa, and Streator Quadrangles, by H. B. Willman and J. Norman Payne)

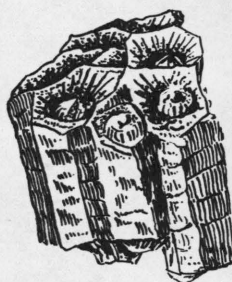
COMMON TYPES of ILLINOIS FOSSILS



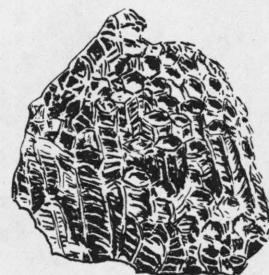
GRAPTOLITE



Cup coral

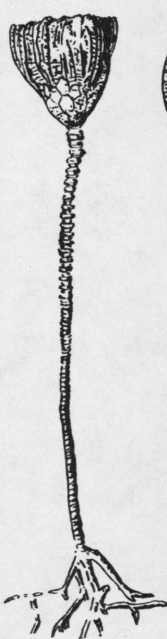


Lithostrotion



Honeycomb coral

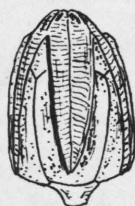
CORALS



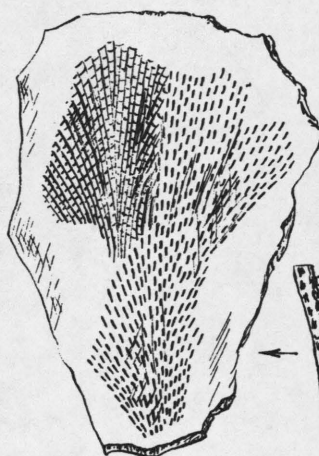
CRINOID



CYSTOID



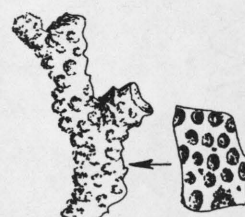
PENTREMITE



Fenestella



Archimedes



Branching

BRYOZOA



Lingula



Orbiculoidea



Spiriferoid



Productoid



Composita



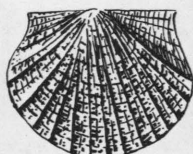
Pentameroid

BRACHIOPODS

COMMON TYPES of ILLINOIS FOSSILS



"Clam"



"Scallop"

PELECYPODS



High - spired

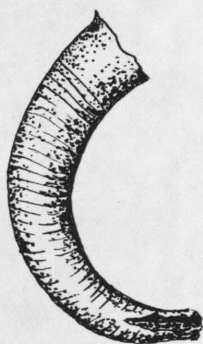


Low - spired



Flat - spired

GASTROPODS



Curved cone



Straight cone

CEPHALOPODS



Coiled cone
(Nautilus)



Bumastus



Calymene
(coiled)



OSTRACODS
(greatly enlarged)



Calymene
(flat)

TRILOBITES

